Abstract of the Disclosure

The present invention relates to a method and system for compressing a continuous data flow in real-time based on lossy compression. In real-time data compression, a series of multi-dimensional data subsets acquired in a given period of time are treated as a regional data cube for the purpose of dividing a continuous series of data subsets into a plurality of data cubes. In a first embodiment implementation of parallel processing using a plurality of compression engines is facilitated by separating a data cube into a plurality of clusters comprising similar spectral vectors. By separating the data cube into clusters of similar spectral vectors no artificial spatial boundaries are introduced substantially improving image quality. Furthermore, the spectral vectors within a cluster are more easily compressed due to their similarity. In a second embodiment a predetermined number of 2D focal plane frames in a boundary area of a previous regional data cube close to a current regional data cube are included in a training set used for codevector training for the current region. Therefore, no artificial boundary occurs between the two adjacent regions when codevectors trained in this way are used for codebook generation and encoding of the spectral vectors of the current regional data cube substantially reducing image artifacts between adjacent regions. A remedy for the single bit error problem is provided in a third embodiment. Full redundancy of compressed data for a regional data cube is obtained by combining the previous regional data cube and the current regional data cube for codebook training. In order to obtain redundancy for the index map, the codebook is used to encode the current regional data cube as well as the previous regional data cube producing a baseline index map for the current regional data cube and a redundant index map for the previous regional data cube. Therefore, full redundancy for a regional data cube is provided allowing restoration of a regional data cube if its codebook and/or index map are corrupted or lost due to single bit errors.